

COURSE OVERVIEW ME0375
Pump Selection, Installation, Operation, Performance, Control,
Maintenance & Troubleshooting

Course Title

Pump Selection, Installation, Operation, Performance, Control, Maintenance & Troubleshooting

Course Date/Venue

Session 1: January 18-22, 2026/Crowne Meeting Room, Crowne Plaza Al Khobar, KSA

Session 2: August 16-20, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai UAE



Course Reference

ME0375



Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

Course Description



This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.



The course is designed to provide an in-depth perspective of centrifugal pump technology in terms of selection, operation, performance, control, maintenance and repair. Topics covered include pump types and terminology, packing, mechanical seals and sealing systems, bearings, couplings and other vital components. In addition, various pump types will be examined as to how they perform in their respective operating systems and advantages/disadvantages of various pump types will be discussed. Centrifugal pump operation, troubleshooting and maintenance will be dealt with in depth.



The course will provide participants with a complete and up-to-date knowledge of pumps and their systems. Further, participants will learn more about selection, operation and maintenance strategies which will assist in increasing pump availability and reliability. Upon the completion of this course, participants will be able to troubleshoot all types of pump problems.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply proper techniques in selection, installation, operation, performance, control, maintenance and troubleshooting of various types of centrifugal pumps used in process industry
- Maintain and troubleshoot all types of pumps including the failure analysis and troubleshooting of packing and mechanical seals
- Properly maintain pump bearings and describe the importance of couplings and alignment
- Implement the maintenance and reliability programs to analyze and minimize pump costs and improve its reliability

Exclusive Smart Training Kit - H-STK®



Participants of this course will receive the exclusive “Haward Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.

Who Should Attend

This course provides an overview of all significant aspects and considerations of centrifugal pumps for those who are involved in the selection, installation, operation, performance, control, maintenance and troubleshooting of pumps. This includes plant and maintenance engineers, process engineers, maintenance technical staff, production & operation staff and reliability specialists working in a wide variety of process plant environments such as petrochemical, plastics, fertilizers, power utilities, oil, gas and water utilities.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

US\$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations:-

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

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The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Mr. Karl Thanasis, PEng, MSc, MBA, BSc, is Senior Mechanical & Maintenance Engineer with over 30 years of extensive industrial experience. His wide expertise includes Piping & Pipeline, Maintenance, Repair, Shutdown, Turnaround & Outages, Maintenance & Reliability Management, Mechanical Maintenance Planning, Scheduling & Work Control, Advanced Techniques in Maintenance Management, Predictive & Preventive Maintenance, Maintenance & Operation Cost Reduction Techniques, Reliability Centered Maintenance (RCM), Machinery Failure Analysis, Rotating Equipment Reliability Optimization & Continuous Improvement, Material Cataloguing, Mechanical & Rotating Equipment Troubleshooting & Maintenance, Root Cause Analysis & Reliability Improvement, Condition Monitoring, Root Cause Failure Analysis (RCFA), Steam Generation, Steam Turbines, Power Generator Plants, Gas Turbines, Combined Cycle Plants, Boilers, Process Fired Heaters, Air Preheaters, Induced Draft Fans, All Heaters Piping Work, Refractory Casting, Heater Fabrication, Thermal & Fired Heater Design, Heat Exchangers, Heat Transfer, Coolers, Power Plant Performance, Efficiency & Optimization, Storage Tank Design & Fabrication, Thermal Power Plant Management, Boiler & Steam System Management, Pump Operation & Maintenance, Chiller & Chiller Plant Design & Installation, Pressure Vessel, Safety Relief Valve Sizing & Selection, Valve Disassembling & Repair, Pressure Relief Devices (PSV), Hydraulic & Pneumatic Maintenance, Advanced Valve Technology, Pressure Vessel Design & Fabrication, Pumps, Turbo-Generator, Turbine Shaft Alignment, Lubrication, Mechanical Seals, Packing, Blowers, Bearing Installation, Couplings, Clutches and Gears. Further, he is also versed in Wastewater Treatment Technology, Networking System, Water Network Design, Industrial Water Treatment in Refineries & Petrochemical Plants, Piping System, Water Movement, Water Filtering, Mud Pumping, Sludge Treatment and Drying, Aerobic Process of Water Treatment that includes Aeration, Sedimentation and Chlorination Tanks. His strong background also includes Design and Sizing of all Waste Water Treatment Plant Associated Equipment such as Sludge Pumps, Filters, Metering Pumps, Aerators and Sludge Decanters.

Mr. Thanasis has acquired his thorough and practical experience as the **Project Manager, Plant Manager, Area Manager - Equipment Construction, Construction Superintendent, Project Engineer and Design Engineer.** His duties covered **Plant Preliminary Design, Plant Operation, Write-up of Capital Proposal, Investment Approval, Bid Evaluation, Technical Contract Write-up, Construction and Sub-contractor Follow up, Lab Analysis, Sludge Drying and Management of Sludge Odor and Removal.** He has worked in various companies worldwide in the **USA, Germany, England and Greece.**

Mr. Thanasis is a **Registered Professional Engineer** in the **USA and Greece** and has a **Master and Bachelor** degrees in **Mechanical Engineering with Honours** from the **Purdue University** and **SIU** in **USA** respectively as well as an **MBA** from the **University of Phoenix** in **USA.** Further, he is a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management (ILM)** a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, seminars, workshops and conferences worldwide.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 - 0800	<i>Registration & Coffee</i>
0800 - 0815	<i>Welcome & Introduction</i>
0815 - 0830	PRE-TEST
0830 - 0930	Pump Types & Terminology <i>Pumps • Pump Terminology • Nomenclature and Definitions • Pump Types</i>
0930 - 0945	<i>Break</i>
0945 - 1100	Centrifugal Pumps <i>Centrifugal Pump Theory • Operating Characteristics • Centrifugal Pump Operation • Cavitations and NPSH • Elements of Minimum Continuous Safe Flow (MCSF) • How to Calculate MCSF • Types of Centrifugal Pumps</i>
1100 - 1200	Centrifugal Pump Specification & Selection <i>Selecting a Pump Vendor • Industry Standards • API vs. ANSI Standards • Driver Size Selection</i>
1200 - 1215	<i>Break</i>
1215 - 1420	Centrifugal Pump Specification & Selection (cont'd) <i>Variable Speed Drive Selection • Pump Design Audit/Review</i>
1420 - 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow</i>
1430	<i>Lunch & End of Day One</i>

Day 2

0730 - 0930	Centrifugal Pump Maintenance & Repair <i>Parts of Centrifugal Pumps • Bearing Basics • Balancing Criteria • Installation and Startup</i>
0930 - 0945	<i>Break</i>
0945 - 1100	Centrifugal Pump Maintenance & Repair (cont'd) <i>Troubleshooting Centrifugal Pumps • Inspecting Centrifugal Pump Components for Wear • Centrifugal Pump Overhaul • Case Studies</i>
1100 - 1200	Positive Displacement Pumps <i>Reciprocating Pumps • NPSH Requirement for Reciprocating Pumps • Rotary Pump Theory and Operation • PD Pumps in the Operating System • How to Select Progressing Cavity Pumps</i>
1200 - 1215	<i>Break</i>
1215 - 1420	Special Purpose PD Pumps <i>Fluid Metering System Design and Options • PD Metering Pumps, Plunger Pumps, Diaphragm Pumps, Rotary Metering Pumps • Controlling Pulsation and Surge</i>
1420 - 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow</i>
1430	<i>Lunch & End of Day Two</i>

Day 3

0730 – 0930	Selection of PD Pumps Selecting Reciprocating (Power) Pumps • Selecting Rotary Gear Pumps • Selecting Screw Pumps • Handling Abrasives and Corrosives with PD Pumps
0930 – 0945	Break
0945 – 1100	Positive Displacement Pump Operation, Maintenance & Repair Operation • Reciprocating (Power) Pump Liquid End Maintenance • Reciprocating Pump Valve Repair
1100 – 1200	Positive Displacement Pump Operation, Maintenance & Repair (cont'd) Power End Maintenance • Stuffing Box Design and Upgrading • Case Studies
1200 – 1215	Break
1215 – 1420	Packing & Mechanical Seals Compression Packing • Molded (Automatic) Packing • Basic Principles of Mechanical Seals • Face Materials • Secondary Seal Materials • Single Mechanical Seals • Single Mechanical Seal Flushing Plans
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Three

Day 4

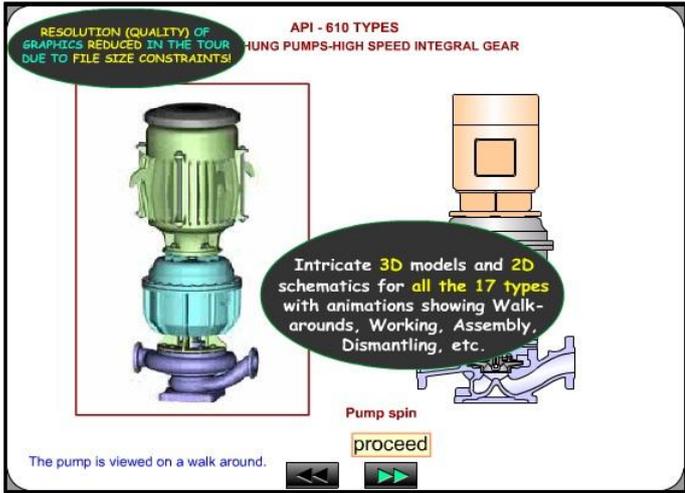
0730 – 0930	Mechanical Seal Systems Dual Sealing Systems and Flushing Plans • API 682 Reference Guide • Gas Barrier Seal Technology • Tough Applications: Slurries, Pulp and Paper, Abrasives, Crystallizing Fluids, High Temperature Fluids, Autoclaves, Mixers and Reactors • Mechanical Seal Selection Strategies
0930 – 0945	Break
0945 – 1100	Mechanical Seal Failure Analysis & Troubleshooting Failure Analysis • Mechanical Seal Troubleshooting • Determining Leakage Rates • Ascertaining Seal Stability • Troubleshooting Hydraulic Instability
1100 – 1200	Mechanical Seal Maintenance & Repair Bellows Seal Repair • Cartridge Seal Installation and Management • Seal Face Care • Seal Consolidation and Standardization Programs
1200 – 1215	Break
1215 – 1420	Bearing Care & Maintenance Basic Concepts of Bearings • Bearing Classifications • Bearing Care and Maintenance • Lubrication Management
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Four

Day 5

0730 - 0930	Couplings & Alignment <i>Purpose of Couplings • Types of Couplings • Alignment Methods • Foundation and Grouting Guidelines • Inlet Piping Configuration and Piping Installation Guidelines</i>
0930 - 0945	Break
0945 - 1100	Pump Maintenance & Reliability <i>A Systems Approach to Pump Reliability • Predictive/Preventive</i>
1100 - 1200	Pump Maintenance & Reliability (cont'd) <i>Addressing Pump Vibrations - Mechanical & Hydraulic • Fifty Upgrading Opportunities for Centrifugal Pumps</i>
1200 - 1215	Break
1215 - 1345	Reliability Programs <i>Building Availability Data • Availability and Reliability Goals • How to Analyze Pump Costs • How to Initiate a Pump Reliability Improvement Program</i>
1345 - 1400	Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
1400 - 1415	POST-TEST
1415 - 1430	Presentation of Course Certificates
1430	Lunch & End of Course

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulator “Centrifugal Pumps and Troubleshooting Guide 3.0”.



Centrifugal Pumps and Troubleshooting Guide 3.0

Course Coordinator

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